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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MONDT, JOHANNES P	
ART UNIT	PAPER NUMBER
3663	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/22/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/360,582	BLACKBURN, BRANDON W.	
	Examiner	Art Unit	
	Johannes P. Mondt	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Amendment filed 9/26/06 forms the basis for this office action. In said Amendment applicant substantially amended all claims at least through substantial amendment of independent claims 1, 5 and 8. Applicant also amended both the drawings of Figure 1 and of Figure 2. Applicant also amended the Specification. Claims 1 and 4-8 are pending. Comments on "Remarks" submitted with said Amendment are included below under "Response to Arguments".

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference signs jointly mentioned with reference to a single Figure in the description: in particular numerals 12 and 30 are not shown in relation to its other in a single Figure and their relationship has been made more confusing by amendment:

   Figure 1 schematically shows "neutron source" 12 but not 30. Figure 2 shows "portion 30 of 12" but not 12. But: in use, target 32 is the material that produces neutrons upon being hit by accelerator beam of energetic particles (protons or deuterons) (see original Specification, page 6, line 6). Accordingly, 30 appears to comprise 12 rather than the other way around as suggested by the language. Applicant should provide a Drawing wherein the relation between 12 and 30 is illustrated in one and the same Figure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. This objection is a repeat of the objection in section 1 under "Drawings" provided in the previous action on the merits.

Specification

1. The amendment to the specification is objected to for reference to both elements 12 and 30 in the description of Figure 1 while only numeral 12 is shown in said Figure 1.
2. The specification is furthermore objected to for not disclosing the connection nor the topographic relation between the neutron source 12 and a portion thereof described by numeral 30 shown in Figure 2.

Figure 1 schematically shows "neutron source" 12 but not 30. Figure 2 shows "portion 30 of 12" but not 12. But: in use, target 32 is the material that produces neutrons upon being hit by an accelerator beam of energetic particles (protons or deuterons) (see original Specification, page 6, line 6). Accordingly, 30 appears to comprise 12 rather than the other way around as suggested by the language. However,

this is evidently not the case according to the Specification, especially the amended portion. As shown in Figure 2, the heart of the neutron source is target 32. Figure 2 also shows the surroundings of said target. Neutrons are produced in said target through collisions between target atoms and energetic particles in the accelerator beam, with velocities distributed over all directions in solid angle 4π. Therefore, although a portion of an outlet can be said to be shown in Figure 2, "outlet" cannot possibly imply any guide or channel for said neutrons: no such guide or channel is shown in any Drawings, or discussed in the original Specification, while any reference to Eggers is in error at least because Eggers has not been incorporated by reference in the original specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. ***Claims 1-2 and 4-8*** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

In particular, a method of cooling a low Z target material for a neutron assembly or a liquid cooling system for a neutron assembly or a neutron source assembly having a liquid cooled target with cooling system, including a nozzle submerged in liquid gallium

as recited in independent claims 1 (line 3), claim 5, line 7) and claim 8 (line 5) has not been disclosed in the original Specification including original claims. According to the Specification, the "liquid gallium fills chamber 40", while the "source includes a nozzle 34". However, not disclosed is whether nozzle (shown over or in chamber 40 (Figure 2) is in said chamber 40, nor whether, even if nozzle 34 is in chamber 40, said chamber is filled enough so as to cause said nozzle to be submerged in said liquid gallium. Reference is also made to "initial tests, using water coolant" in a "submerged jet impingement configuration" (Specification, page 6, lines 18-20 as originally filed). However, "submerged jet" does not necessarily mean "submerged nozzle" (see, e.g., Pais et al, IEEE, 1994 Intersociety Conference on Thermal Phenomena, "Single-Phase Heat Trnasfer Characteristics of Submerged Jet Impingement Cooling using JP-5", pp. 178-183, especially title, abstract, and page 182), while, even arguendo, the experiments "to illustrate the effectiveness of gallium cooling" (pages 7-8 of original Specification) are described without reference to either submerged jet or submerged nozzle. In conclusion, original Specification and claims do not support the amendment to claims 1, 5 and 8 and to dependent claims 2, 4, and 6-7.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. ***Claims 1 and 5*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Eggers (5,392,319) (previously made of record as Prior Art and cited in Specification) in view of Lidsky et al (previously made of record) and Pais et al (IEEE 0-7803-1372-0, 1994).

On claim 1: Eggers teaches (see title, abstract, and Figures 1, 10-11) a method of cooling a low Z target material of a neutron source assembly, comprising: providing flow of liquid coolant (light water and D_2O; col. 12, l. 51 – col.13, l. 68) to a low Z (col. 6, l. 13-58 and col. 7, l. 5-20) target material (target support region 116, on target carriage 26) (loc.cit.) to cool the low Z target material (loc.cit.).

Eggers does not necessarily teach said liquid gallium as liquid coolant. However, it would have been obvious to include the teaching of liquid gallium as coolant for an irradiation target in view of Lidsky et al (col. 7, l. 10-20) being at least suitable as equivalent to water (loc.cit.). It has been held that the selection of a particular material known in the art to be suitable for its intended purpose would be entirely obvious. In re Leshin 125 USPQ 416. Eggers further teaches the liquid coolant 134 (col. 9, l. 28) to be provided to a non-bombarded surface (inside surface of 116 within 26 rather than the outside surface bombarded by the ion beam 22 (see Figures 1, 10).

Eggers does not necessarily teach the limitation of using "a nozzle submerged in said liquid gallium, a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target material". However, it would have been obvious to include said limitation in view of Pais et al, who, in art (inter alia on X-ray medical devices) on cooling by jet impingement (title, abstract, Introduction, page 178),

hence in this regard analogous to Eggers, teach hitting the target in a direction normal to a non-bombarded surface of said low Z target material (see Figure 1 and Introduction, page 178) with a submerged jet (title, abstract) in which cooling method the nozzle is preferably completely submerged in the cooling liquid (see "Fully submerged Nozzle and Surface", page 182, and compare Figure 7 for the case of submerged nozzle with Figure 8, showing a superior heat transfer in the former case, also summarized in the conclusions (page 181-182). *Motivation* to include the teaching by Pais et al in the invention by Eggers derives from the enhanced heat transfer and consequent higher cooling efficiency, as illustrated by Figure 7 when compared with Figure 8 in Pais et al and the Conclusions by Pais et al of larger heat transfer coefficients (page 182). Parenthetically, the physics behind the superior heat transfer of submerged jets over free surface jet impingement has long been understood: see, e.g., Christiaens et al (5,795,063), especially the discussion in col. 8, l. 35-63), being due to heat transfer by turbulence. Said turbulence arises whenever a submerged jet mixes with the surrounding liquid and hence applies also to the topography of Eggers.

On claim 5: Eggers teaches a neutron source assembly 10 (title, abstract, col. 5, l. 40 – col. 6, l. 58) having a liquid cooled target (light water and D_2O; col. 12, l. 51 – col.13, l. 68), comprising: an accelerator based neutron source 16/26/116 (accelerator 16 (col. 7, l. 5-20), target carriage 26 and target 116 (col. 7, 5-20 and col. 8, l. 62-66) including a low Z target material (such as boron or beryllium) (col. 6, l. 13-59) (namely: low Z target 116 on target carriage 26; see col. 7, l. 5-20 and col. 8, l. 62-66) that is bombarded by accelerated particles (through proton accelerator 16; see col. 6, l. 13-51)

to produce a neutron flux (col. 6, l. 13-59); and a cooling system (72/90 a/o, see above) to circulate liquid coolant (light water and D_2O; see above) through said accelerator based neutron source (namely: through 16/26/116) to cool the low Z target material.

Eggers does not necessarily teach said liquid gallium as liquid coolant. However, it would have been obvious to include the teaching of liquid gallium as coolant for an irradiation target in view of Lidsky et al (col. 7, l. 10-20) being at least suitable as equivalent to water (loc.cit.). It has been held that the selection of a particular material known in the art to be suitable for its intended purpose would be entirely obvious. In re Leshin 125 USPQ 416. Eggers further teaches the liquid coolant 134 (col. 9, l. 28) to be provided to a non-bombarded surface (inside surface of 116 within 26 rather than the outside surface bombarded by the ion beam 22 (see Figures 1, 10).

Eggers does not necessarily teach the limitation "said nozzle being submerged in said liquid gallium to provide a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target material".

However, whether said nozzle is submerged in liquid gallium and provides a submerged jet or not are limitations of intended use within the framework of the device invention of claim 5 (neutron source assembly being the device). Applicant is reminded that In reference to the claim language referring to "said nozzle being submerged" and "submerged jet", intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a

process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963).

Furthermore, even arguendo, it would have been obvious to include said limitation in *view of Pais et al*, who, in art (inter alia on X-ray medical devices) on cooling by jet impingement (title, abstract, Introduction, page 178), hence in this regard analogous to Eggers, teach a target positioned in an assembly such that jets are capable to be directed and impinge normal to a non-bombarded surface of said low Z target material (see Figure 1 and Introduction, page 178) with a submerged jet (title, abstract) in which assembly the nozzle is preferably completely submerged in the cooling liquid (see "Fully submerged Nozzle and Surface", page 182, and compare Figure 7 for the case of submerged nozzle with Figure 8, showing a superior heat transfer in the former case, also summarized in the conclusions (page 181-182). *Motivation* is spelled out by Pais et al to be the enhanced heat transfer, hence better cooling (see "Conclusions", page 182). Parenthetically, the physics behind the superior heat transfer of submerged jets over free surface jet impingement has long been understood: see, e.g., Christiaens et al (5,795,063), especially the discussion in col. 8, l. 35-63), recited here not for teaching but for fact only.

3. ***Claims 2, 4, 6 and 7*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Eggers, Lidsky et al and Pais et al as applied to claims 1 and 5 above, respectively, and further in view of Alger et al (4,141,224) (previously made of record and cited).

As detailed above, claims 1 and 5 are unpatentable over Eggers in view of Lidsky and Pais et al.

On claim 2: Eggers also teaches a reservoir for the coolant (inherently existing as otherwise conduit 90 could not deliver said liquid coolant) (cf. col. 8, l. 24-29) (see Figures 1 and 10) while Eggers also teaches a heat exchanger 132 or 226 (col. 9, l. 23-35 and col. 13, l. 34) through which heat is removed from the liquid coolant, said liquid coolant, when adopting the teaching by Lidsky et al being liquid gallium as explained in the rejection of claim 1. *Furthermore, although no specific pumping process, - of coolant from coolant reservoir, is necessarily taught by the above references, it would have been obvious to create one in the case of a more expensive coolant such as liquid gallium, as shown for instance by Alger et al,* who, in art on a cooling apparatus for the cooling of a surface by liquid gallium, hence analogous art, teach a liquid coolant reservoir 23 (col. 2, l. 23-24) while the liquid coolant is pumped from the reservoir (through 27, see col. 2, l. 24 and Figures 1 and 2) through the nozzle 29 (col. 2, l. 57-60) to the (in application to Eggers low Z) target material to cool the target material (see rejection of claim 1 above) and through a heat exchanger 28 (col. 2, l. 24-27) to remove heat from the liquid coolant (a cooling system necessarily effects the exchange of heat and hence is a heat exchanger). *Motivation* to include the teaching by Alger et al derives from the advantage that the liquid gallium coolant can be re-used.

On claim 4: the target material in Eggers comprises beryllium (col. 6, l. 48-51).

On claims 6-7: Eggers teaches a reservoir (inherently existing as otherwise conduit 90 could not deliver said liquid coolant) (cf. col. 8, l. 24-29) (see Figures 1 and

10) while Eggers also teaches a heat exchanger 132 or 226 in fluid connection with said reservoir of liquid coolant (col. 9, l. 23-35 and col. 13, l. 34) through which heat is removed from the liquid coolant, said liquid coolant, when adopting the teaching by Lidsky et al being liquid gallium as explained in the rejection of claim 5 (*prima facie* obviousness ensured, see case law reference there).

Eggers does not necessarily teach the claimed means for circulating. However, it would have been obvious to include said means in view of the cooling apparatus as taught by Alger et al comprising a liquid coolant reservoir 23 (col. 2, l. 23-24) while the liquid coolant is pumped from the reservoir (through 27, see col. 2, l. 24 and Figures 1 and 2) through the nozzle 29 (col. 2, l. 57-60) to the (in application to Eggers low Z) target material to cool the target material (see rejection of claim 1 above) and through a heat exchanger 28 (col. 2, l. 24-27) to remove heat from the liquid coolant (a cooling system necessarily effects the exchange of heat and hence is a heat exchanger), as well as means for circulating said liquid coolant between said reservoir 23, said heat exchanger 28 and said accelerator based neutron source 11 in the form of pump 27 (thus meeting the additional limitation defined by claim 7) and nozzle 29 (col. 2, l. 24 and col. 2, l. 28-30). *Motivation* to include the teaching by Alger et al in the invention by Egger and Lidsky et al derives from the more efficient cooling through improved circulation as expressed by Alger et al (col. 1, l. 19-33 and 45-65) as is also generally known in the art of cooling apparatus as conventional, while circulating enables re-use, which is important for a more expensive coolant such as gallium, which expense is,

however amply compensated by the much higher coefficient of thermal conductivity (see applicant's admission in this regard on page 7 of the Specification).

4. ***Claim 8*** is rejected under 35 U.S.C. 103(a) as being unpatentable over Eggers in view of Lidsky et al, Pais et al and Alger et al.

Eggers teaches a liquid cooling system for a neutron source assembly (title, abstract, col. 5-17; Figures 1 and 10-11), said cooling system comprising: a reservoir (inherently existing behind check valve 92 of 90 as otherwise conduit 90 could not deliver said liquid coolant (col. 8, l. 24-29) (see Figures 1 and 10)); a heat exchanger 132 or 226 in fluid connection with said reservoir of liquid coolant (col. 9, l. 23-35 and col. 13, l. 34). Eggers also teach a low Z target material (116 on 26) within the neutron source assembly 10 (col. 5, 63-68, col. 6, l. 13-58, col. 7, l. 5-20 and col. 8, l. 62-63).

Eggers does not necessarily teach said liquid gallium as liquid coolant. However, it would have been obvious to include the teaching of liquid gallium as coolant for an irradiation target in view of Lidsky et al (col. 7, l. 10-20) being at least suitable as equivalent to water (loc.cit.). It has been held that the selection of a particular material known in the art to be suitable for its intended purpose would be entirely obvious. In re Leshin 125 USPQ 416. Eggers further teaches the liquid coolant 134 (col. 9, l. 28) to be provided to a non-bombarded surface (inside surface of 116 within 26 rather than the outside surface bombarded by the ion beam 22 (see Figures 1, 10).

Eggers does not necessarily teach the limitation "a nozzle, said nozzle being submerged in said liquid gallium to provide a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target material".

However, apart from the nozzle itself, whether said nozzle is submerged in liquid gallium and provides a submerged jet or not are limitations of intended use within the framework of the device invention of claim 5 (neutron source assembly being the device). Applicant is reminded that In reference to the claim language referring to "said nozzle being submerged" and "submerged jet", intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963).

Furthermore, arguendo, it would have been obvious to include said limitation in *view of Pais et al*, who, in art (inter alia on X-ray medical devices) on cooling by jet impingement (title, abstract, Introduction, page 178), hence in this regard analogous to Eggers, teach a target positioned in an assembly such that jets are capable to be directed and impinge normal to a non-bombarded surface of said low Z target material (see Figure 1 and Introduction, page 178) with a submerged jet (title, abstract) in which assembly a nozzle is preferably completely submerged in the cooling liquid (see "Fully submerged Nozzle and Surface", page 182, and compare Figure 7 for the case of submerged nozzle with Figure 8, showing a superior heat transfer in the former case, also summarized in the conclusions (page 181-182). *Motivation* is spelled out by Pais et al to be the enhanced heat transfer, hence better cooling (see "Conclusions", page

182). Parenthetically, the physics behind the superior heat transfer of submerged jets over free surface jet impingement has long been understood: see, e.g., Christiaens et al (5,795,063), especially the discussion in col. 8, l. 35-63).

Eggers does not necessarily teach the claimed means for circulating. However, it would have been obvious to include said means in view of the cooling apparatus as taught by Alger et al comprising a liquid coolant reservoir 23 (col. 2, l. 23-24) while the liquid coolant is pumped from the reservoir (through 27, see col. 2, l. 24 and Figures 1 and 2) through the nozzle 29 (col. 2, l. 57-60) to the (in application to Eggers low Z) target material to cool the target material (see rejection of claim 1 above) and through a heat exchanger 28 (col. 2, l. 24-27) to remove heat from the liquid coolant (a cooling system necessarily effects the exchange of heat and hence is a heat exchanger), as well as means for circulating said liquid coolant between said reservoir 23, said heat exchanger 28 and said accelerator based neutron source 11 in the form of pump 27 and nozzle 29 (col. 2, l. 24 and col. 2, l. 28-30). *Motivation* to include the teaching by Alger et al in the invention by Egger and Lidsky et al derives from the more efficient cooling through improved circulation as expressed by Alger et al (col. 1, l. 19-33 and 45-65) as is also generally known in the art of cooling apparatus as conventional, while circulating enables re-use, which is important for a more expensive coolant such as gallium, which expense is, however amply compensated by the much higher coefficient of thermal conductivity (see applicant's admission in this regard on page 7 of the Specification).

Response to Arguments

3. Applicant's arguments filed 9/26/06 have been fully considered but they are not persuasive. In particular,

(1) Arguments in support of Replacement Sheets fail to fully address the objection to the Drawings provided in the previous office action. Specifically, the relation between 12 (which is the neutron source) and 30 (which is "a portion" of said neutron source, see page 6, line 3, of the original Specification) is still not illustrated. Furthermore, the amendments to the Specification per 9/26/06 and 2/17/05 are herewith objected to because according to applicant's own admission support is provided for incorporation by reference of Eggers (5,392,319), which, however, never had been incorporated by reference but merely referred to in the original specification (page 4). While an accelerator beam hits target 32 thus producing neutrons, structure 30 can be said to comprise the neutron source itself, a distinction between neutron source indicated by 12 and outlet for neutrons 30 appears to introduce degeneracy in the identification by numerals of the neutron source.

(2) The amendment to the Specification is objected to for reasons provided under "Specification" overleaf.

(3) New matter appears to have been introduced through amendment for reasons provided under "Claim Rejections" under 35 U.S.C. 112, first paragraph, overleaf.

(4) The new limitations would not place the application in condition for allowance in light of rejections over the Prior Art, as provided above under Claim Rejections under 103(a).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JPM
December 10, 2006

Patent Examiner:

Johannes Mondt (Art Unit: 3663)